

## LOW TEMPERATURE GAS PHASE KINETICS PROBED WITH CHIRPED-PULSE MICROWAVE SPECTROSCOPY AND LASER INDUCED FLUORESCENCE

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Over 200 molecules have been identified in the interstellar medium (ISM), roughly a third of which are complex organic molecules, carbon-containing molecules with 6 or more atoms. The chemistry in the non-equilibrium environment of the ISM is in the kinetic, rather than thermodynamic limit, and astrochemical models seeking to reproduce the abundances observed in the interstellar medium (ISM) are often limited by a lack of low-temperature experimental data for relevant reactions. We seek to directly measure rate coefficients at temperatures between 20–90 K. Here we will discuss the development of a new instrument that combines the complementary techniques of laser induced fluorescence (LIF) and chirped pulse Fourier transform microwave (CP-FTMW) spectroscopy with the CRESU method (French acronym for "reaction kinetics in a uniform molecular flow") using pulsed laser photolysis to initiate the desired reaction. The derived rate constants and branching ratios can then be incorporated into chemical models, improving the astronomical community's ability to interpret the wealth of data currently being generated by telescopes like ALMA.